

**DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF ENGINEERING SERVICES**  
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## METHODS FOR THE CHEMICAL ANALYSIS OF WATER

**CAUTION:** Prior to handling test materials, performing equipment setups, and/or conducting this method, testers are required to read "**SAFETY AND HEALTH**" in Section F of this method. It is the responsibility of the user of this method to consult and use departmental safety and health practices and determine the applicability of regulatory limitations before any testing is performed.

### A. SCOPE

Submitted water samples are analyzed either partially or completely, depending upon the intended use.

Water to be used in portland cement concrete is usually analyzed only for total solids and pH. If the total solids are excessive (above 2000 ppm), or if the pH is decidedly acid or alkaline, an analysis for chlorides and sulfates should be made. The purpose of this is to determine if the sample contains deleterious dissolved materials, which would adversely affect the properties of the concrete.

Sometimes water samples are submitted for a complete anion and cation analysis. The following methods include the complete scheme for the systematic analysis of water in addition to the methods detailed for the analysis of water used in portland cement concrete.

Determine the following properties and constituents of water using the procedures that are specified in the accompanying references.

### B. REAGENTS

Unless otherwise indicated, all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.

### C. TOTAL SOLIDS

Refer to Standard Methods for the Examination of Water and Wastewater, Total Solids Method 2540B; except dry using an oven at 110°C. Report results to the nearest 10 ppm if the dry residue is over 100 mg and to the nearest 1 ppm for residue less than 100 mg.

### D. SODIUM, POTASSIUM, IRON AND MANGANESE

Determine in accordance with ASTM Designation: D 1976, Inductively Coupled Argon Plasma Atomic Emission Spectroscopy. Alternatively, Method 3120B of the Standard Methods for the Examination of Water and Wastewater may also be used.

### E. MISCELLANEOUS DETERMINATIONS

Refer to the appropriate method of analysis in ASTM Standards or Standard Methods for the Examination of Water and Wastewater.

### F. SAFETY AND HEALTH

This method may involve hazardous materials, operations, and equipment. This method does not purport to address all the safety problems associated with its use. It is the responsibility of the user of this method to consult and establish appropriate safety and health practices

and determine the applicability of regulatory limitations prior to use.

Observe good hygiene practices. Wash hands after handling samples and before eating, drinking or smoking.

Prior to handling, testing or disposing of any of waste materials, testers are required to read: Part A (Section 5.0), Part B (Sections: 5.0, 6.0, 10.0 and 12.0) and Part C (Section 1.0) of Caltrans Laboratory Safety Manual. These sections pertain to requirements for general safety principles, standard operating procedures, protective apparel, disposal of materials, and how to handle spills, accidents, emergencies, etc. Users of this method do so at their own risk.

#### **REFERENCES**

**ASTM Designation: D 1976.**

**“Standard Methods for the Examination of Water and Wastewater”, American Public Health Association**

**End of Text**

**(California Test 405 contains 2 pages)**